

**NORTH CAROLINA
DIVISION OF AIR QUALITY**
Application Review

Issue Date: xx

Region: Winston-Salem Regional Office
County: Guilford
NC Facility ID: 4100923
Inspector's Name: Robert Barker
Date of Last Inspection: 07/24/2019
Compliance Code: 3 / Compliance - inspection

Facility Data Applicant (Facility's Name): City of Greensboro - T.Z. Osborne Water Reclamation Facility Facility Address: City of Greensboro - T.Z. Osborne Water Reclamation Facility 2350 Huffine Mill Road McLeansville, NC 27301 SIC: 4953 / Refuse Systems NAICS: 562213 / Solid Waste Combustors and Incinerators Facility Classification: Before: Title V After: Title V Fee Classification: Before: Title V After: Title V				Permit Applicability (this application only) SIP: 02D .0516 and .1204 NSPS: Part 60 Subpart O NESHAP: Part 61 Subparts C and E PSD: N/A PSD Avoidance: 02Q .0317 NC Toxics: N/A 112(r): N/A Other: 40 CFR 503 Subpart E and 02Q .0315 (Title V Avoidance)			
Contact Data				Application Data Application Number: 4100923.20A Date Received: 04/16/2020 Application Type: Modification Application Schedule: TV-Significant Existing Permit Data Existing Permit Number: 04489/T25 Existing Permit Issue Date: 12/16/2020 Existing Permit Expiration Date: 07/31/2021			
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Total Actual emissions in TONS/YEAR:							
CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2018	4.47	20.73	7.79	6.93	0.6100	6.96	3.07 [Dichlorobenzene(p), 1,4-]
2017	0.6950	6.79	7.35	1.31	0.5800	7.39	3.78 [Dichlorobenzene(p), 1,4-]
2016	6.19	6.67	7.45	2.89	0.7300	7.41	3.78 [Dichlorobenzene(p), 1,4-]
2015	8.36	38.80	7.21	9.42	1.17	7.32	3.85 [Dichlorobenzene(p), 1,4-]
Review Engineer: Rahul Thaker Review Engineer's Signature:				Comments / Recommendations: Issue 04489/T26 Permit Issue Date: xx Permit Expiration Date: 07/31/2021			

1. Purpose of Application

City of Greensboro - T. Z. Osborne Water Reclamation Facility (“T Z Osborne WWTP”), McLeansville, Guilford County, North Carolina has submitted a permit application primarily to install a new wet scrubber (ID No. CD-22) on the existing fluidized bed incinerator (FBI) (ID No. ES-1) and to allow concurrent operations for both existing FBIs (ID Nos. ES-1 and ES-20). The requested changes have been discussed in detail in Section 5 below.

The DAQ has deemed the application “complete” for processing as of April 16, 2020. It will be processed pursuant to one-step significant modification provision in accordance with 15A NCAC 02Q .0501(b)(1).

2. Facility Description¹

The T Z Osborne WWTP is an advanced wastewater treatment plant (WWTP) with a design capacity of 40 million gallons per day (MGD). The facility is currently under expansion to be upgraded to a 56 MGD biological nutrient reduction wastewater facility. The plant treats both domestic and industrial wastewater from the City and the surrounding community. The plant influent consists of approximately 90% domestic and 10% industrial wastewater.

The current wastewater process is a two-stage activated sludge treatment process. The primary treatment units consist of:

- Four Huber mechanical bar screens
- Four influent pumps
- Two grit classifiers
- Two flow equalization tanks
- Six primary settling tanks
- 18 aeration basins
- 10 secondary settling tanks
- Three centrifuges
- Six tertiary Aqua Diamond cloth filter basins
- One sodium hypochlorite disinfection system with six contact chambers
- Six cascade aeration
- Two discharge outfall pipeline

In addition to the above treatment units, the facility operates equipment for solids treatment and biosolids management, and incineration.

3. Application Chronology

4/16/20	DAQ received the application.
8/5/20	Raised questions and requested information on emissions estimates, new control device’s emissions reduction and performance data, applicant-requested avoidance limits, regulatory requirements, modeling, and application forms.
8/27/20	Received the requested information.
10/21/20-11/10/20	Additional requested information received on Form C8, vendor design specifications and guaranteed performance for the new scrubber, and emissions estimates for the sources other than existing FBIs.
12/18/20	Pre-public notice draft permit documents sent for review to the permitting supervisor, Stationary Source Compliance Branch (SSCB), regional office, and applicant.
1/4/21	Comments on draft permit documents were received from regional office and applicant.

4. Statement of Compliance

Based on the compliance inspection of September 24, 2020, conducted by the Winston-Salem Regional Office, the following conclusions were made:

¹ Information taken from <https://www.ncsafewater.org/news/news.asp?id=410855>, The North Carolina Section of the American Water Works Association (NC AWWA) & The North Carolina Member Association of the Water Environment Federation (NC WEA).

“Based on review of the records and visual observations, the facility appeared to not be operating in compliance with the Air Quality standards and regulations at the time of this inspection. As per Condition 2.1.C.1, which pertains to regulation [0]2D .0515 “Particulates from Miscellaneous Industrial Processes,” the bagfilter (CD-11) for the sand storage silo (ES-17) shall have an internal inspection on an annual basis (12-month period). The last annual internal inspection of the bagfilter was conducted on July 18, 2019, and it has not been inspected since. For not conducting the annual internal inspection within the required 12-month period, the facility is [in] violation of this regulation. **For this violation, the facility will be issued a Notice of Violation and Notice of Recommendation for Enforcement (NOV/NRE).”**

Thus, the DAQ had issued a NOV/NRE on the above matter on September 30, 2020; however, through a letter dated October 14, 2020 and after receiving the applicant response on the matter, the agency has decided not to recommend any enforcement action and resolved the matter.

5. Permit Modification/Changes

In general, as permitted, the sludge is burned in one of the fluidized bed incinerators (ID Nos. ES-1 and ES-20) at any given time. Each incinerator has one hearth, which is equipped with openings to allow air to be blown through the hearth. The flow of air raises and suspends a layer of sand above the hearth and the sand is heated to approximately 1,400°F. As the sludge is pumped into the incinerator, it comes in contact with the fluidized bed of hot sand and results in instantaneous evaporation and then combustion occurs. The same airflow that suspends the sand blows the ash out of the incinerator and into the air scrubbing system where the ash and some of the fine sand is removed. A sand silo provides "make-up" sand and replaces what is removed with the exhaust from the incinerator.

As per the current permit, the emissions of the FBI No.1 (ID No. ES-1) are to be controlled by one hydrosonic wet scrubber (ID No. CD-1) and one wet tray scrubber (ID No. CD-21). Both the FBI No. 1 and the hydrosonic scrubber are out of service circa October 30, 2018². The control device CD-1 has been physically removed from the facility.

The applicant has requested the following changes with respect to the permitted equipment and operation:

- remove the existing hydrosonic wet scrubber (ID No. CD-1), currently permitted to control emissions from the FBI No. 1 (ID No. ES-1).
- install a new multiple Venturipak scrubber (ID No. CD-22) that will be equipped with a wet tray, a venturi throat spray manifold and sorbent polymer composite mercury removal modules, to control emissions from the FBI No. 1 (ID No. ES-1).
- disassociate effluent discharge of the FBI No. 1 (ID No. ES-1) to the existing control device (ID No. CD-21).
- allow simultaneous operation of both existing FBIs (ID Nos. ES-1 and ES-20).

It needs be noted that no changes (physical or operational) to the operation of the second FBI (ID No. ES-20) are proposed and it will continue to discharge its emissions through the permitted control devices (ID Nos. CD-20 and CD-21). In addition, the design capacity to process the sewage sludge for each of the incinerators will not change due to the proposed modifications, which is 6,000 pounds per dry ton (ES-1) and 6,500 pounds per dry ton (ES-20).

VenturiPak Scrubber (ID No. CD-22)

As per the application, the new Venturi Scrubber will be used to remove the ash particles and other gaseous pollutants from the incineration process for the FBI No. 1 (ES-1). Water will be sprayed into warm flue gas for cooling and particle removal. A series of trays and multiple fixed venturis as described below will collect the particles. Drain water from the scrubber is then routed to the ash clarifier while “cleaned / scrubbed” gas exits the exhaust stack.

Condensing Stage - The condensing tray stage conditions the incoming gases by lowering the temperature to moisture saturation and condensing volatile compounds from the gas stream. The impingement tray stage is comprised of three (3) levels of impingement trays; each level consists of four (4) dual-orifice impingement trays. The condenser tray water supply is plant effluent which is connected to

² Per DAQ compliance inspection of July 24, 2019.

one tray water supply nozzle. The water flows across the top tray at the third level and then drains down and across the second level, then drains down to the first level, and finally drains to the bottom cone of the scrubber vessel.

MicroMist™ Venturi Stage - Each Venturi has both high-pressure inlet spray nozzles and high-pressure throat spray nozzles. The Venturi stage is designed to use seven (7) Venturi tubes but can accommodate up to nine (9) as process conditions dictate.

Separator Stage - A single level of Dual-Orifice™ separator trays flooded with water that acts to remove entrained water droplets from the gas stream.

Mist Eliminator Stage - A diaphragm with mesh wire mist eliminator pads installed that capture any residual water entrained in the gas stream that was not eliminated in the previous stages.

SPC Mercury Control Stage - The sorbent polymer composite (SPC) mercury modules are installed after the mist eliminator stage to remove mercury from the gas stream. The SPC backwash motor operated valve provides intermittent water flow to the top of the SPC modules. The purpose of this intermittent “flooding” is to clean dirt and debris that may be caught within the mercury modules.

The mercury stage utilizes adsorbing modules that contain a SPC media held in place by a Hastelloy frame. The SPC media removes and captures mercury from the exhaust gases. By sequestering the mercury in the media, mercury that previously would have been discharged to atmosphere is captured for safe disposal. The SPC media used in this mercury scrubber has been developed by W. L. Gore and Associates (Gore).

The SPC media contains proprietary sorbents and catalysts, which are suspended in a highly hydrophobic porous structure. The SPC media is formed into flat and pleated sheets and placed into a Hastelloy C-22 frame to form each SPC Module. Modules are placed across the cross section of the scrubber to form one layer. Mercury Scrubbers may be anywhere between one and seven layers of modules, depending on mercury reduction goals. Gas flows through the channels formed by the pleated and flat sheets creating minimal pressure drop. Note that the gases do not flow “through” the SPC media.

Mercury is captured by and chemically bound within the SPC material. In addition to reducing mercury, the SPC media converts SO₂ in the gas phase into aqueous sulfuric acid (H₂SO₄), which is removed with the wash water.

The following are the salient design features of the new scrubber:

Pressure drop: 1-50 inches H₂O

Inlet temperature: 100-182 °F

Inlet flow rate: 23,384 acfm (approximate)

Liquid scrubbing medium: water + 25% sodium hydroxide

Minimum liquid injection rate: 400 gal/min

Outlet temperature: < 100 to 113 °F

As per the applicant, “the Venturi Pak scrubber is designed to meet 40 CFR Part 60 MMTM for PM, Heavy Metals, HCl, SO₂ and Mercury...exclude[ing] CO, NO_x, and Dioxin and Furans, which are handled through incinerator operations.” In addition, the scrubber equipment manufacturer has specifically stated that “based on the design conditions given to us from the City, the MACT standards³ the scrubber is designed to meet are as follows”:

“Cadmium (Cd): < 0.0016 mg/dscm @ 7% O₂”

“HCl: < 0.51 ppmvd @ 7% O₂”

“Mercury (Hg): < 0.037 mg/dscm @ 7% O₂”

“Lead (Pb): < 0.0074 mg/dscm @ 7% O₂”

“Particulate Matter (PM): < 18 mg/dscm @ 7% O₂”

“SO₂: < 15 ppmvd @ 7% O₂”

The inspection and maintenance requirements as included in the specifications and described below shall be followed to keep the peak operating efficiency of the scrubber system:

³ 40 CFR 60 Subpart MMTM.

Inspection

Every three months, the manufacturer recommends visually examining the SPC Modules. Visual examination is performed as follows:

1. Turn off the system and operate the ME irrigator system for at least 20 minutes to reduce acid buildup.
2. Open the doors to the Mercury Scrubber.
3. Using a flashlight, inspect the individual modules to make sure that:
 - a. They are all seated on top of the perforated plates and have not moved from their original location.
 - b. The Grey CPVC side panels are still in place
 - c. The SPC Media has not separated from the frame
 - d. There are no gaps between modules
 - e. There are no signs of fouling on the leading edges inside the corrugated media

Maintenance:

Table 5-1 Recommended Maintenance Practices

Component	Maintenance Description	Frequency
Tray Irrigator Spray Lances	Remove lances and check nozzles	Quarterly
Impingement trays	Check trays for excessive build-up	Annually
Venturi Inlet Lances	Remove lances and check nozzles	Quarterly
Venturi tube assembly	Check flange and Morris coupling hardware	Annually
Venturi tube assembly	Check throat nozzles	Quarterly
Venturi water pumps	See manufacturers recommendations	As required
Separator tray	Check trays for excessive build-up	Annually
Mesh pad mist eliminator	Inspect mesh pad for build up	Quarterly
Mesh Pad Irrigator Spray Lance	Remove lances and check nozzles	Quarterly
PC Mercury Modules	Check modules to ensure they have not shifted and the no gaps exist	Quarterly
	Rotate and document SPC modules Location	Typically at the midpoint of the warrantee period
	Remove and replace sample of media and send to analysis laboratory	Typically every 6 to 12 months (as needed)
SPC Mercury Backwash Spray Lance	Remove lances and check nozzles	Quarterly
Pressure gauges	Check for proper operating pressures	Daily
Y-strainers	Check and blow down	Weekly or as required
Basket strainers	Isolate, remove and clean	Weekly or as required

It is this engineer's judgement that the proposed Venturi Pak scrubber system can achieve the required emissions reductions for the FBI No. 1 (ES-1) to comply with the regulatory limits of PM, PM₁₀, PM_{2.5}, sulfur dioxide, cadmium, mercury, lead and HCl, if the above inspection and maintenance are performed and at the frequency level as specified.

FBI No. 1 (ES-1) Emissions:

The following Table 5-2 provides a summary of emissions estimates for the FBI No. 1 (ES-1) taking into account the installation of a new Venturi Pak scrubber (CD-22):

Table 5-2 Emissions Summary

Pollutant	Potential Emissions Before Control	Potential Emissions After Control
	tons/yr	tons/yr
PM	6,044	2.08

Pollutant	Potential Emissions Before Control tons/yr	Potential Emissions After Control tons/yr
PM ₁₀	441	0.15
PM _{2.5}	363	0.12
SO ₂	> 12.88	12.88
NO _x	9.22	9.22
CO	7.27	7.27
VOC	10.51	10.51
Lead	0.53	1.73E-04
GHGs as CO ₂ e	32,374	32,374
Single Largest HAP (1,4 dichlorobenzene)	6.31	6.31
Aggregate HAP	12.42	10.01

In general, the applicant has utilized the emissions factors from the literature⁴ for the uncontrolled emissions scenario and performance stack test data⁵ for the controlled emissions scenario, with certain exceptions noted below.

For PM₁₀ and PM_{2.5} emission rates, the cumulative masses of 7.6 percent and 6.0 percent, respectively, have been used for both the controlled and uncontrolled scenarios for the FBIs with wet scrubber as per the literature⁶.

For SO₂, the controlled emission rate is based upon an applicable emission standard (15 ppm) as discussed elsewhere in this application review. The uncontrolled emission factor (AP-42) for this pollutant results into an uncontrolled emission rate much less than the controlled emission rate, which is untrue as the new control device is expected to reduce uncontrolled SO₂ emissions substantially. Therefore, it is reasonable to expect a higher uncontrolled emission rate than the controlled emission rate (i.e., > 12.88 tons/yr)

For NO_x, CO, and VOCs, the uncontrolled and controlled emission rates are the same and they were determined by the emissions factors developed using the stack test data⁷.

For several types of dioxins and furans (2,3,7,8-TCDD, Total TCDD, Total PCDD, Total HxCDD, Total HpCDD, Total OCDD, 2,3,7,8-TCDF, Total TCDF, Total PCDF, Total HxCDF, Total HpCDF, Total OCDF), and other air toxics (arsenic, cadmium, chromium (VI), hydrogen chloride, lead, mercury, and nickel), the emissions rates for the controlled scenario are based upon the stack test data⁸. For all other air toxics (other than the above), the controlled emissions and the uncontrolled emissions rates are the same.

For GHGs (greenhouse gases), Appendix A-1 “Global Warming Potentials”, Appendix C-1 “Default CO₂ Emission Factors and High Heat Values for Various Types of Fuel”, and Appendix C-2 “Default CH₄ and N₂O Emission Factors for Various Types of Fuel” to Part 98 “Mandatory Greenhouse Gas Reporting Rule” were used to estimate their emissions rates. The Biomass fuels—solid category (Solid Byproducts subcategory) was determined to be appropriate for the sewage sludge combustion emissions factors for various GHG constituents.

For the performance test data, it needs to be clarified that the last stack testing on FBI No. 1 was conducted on October 20, 2016 with the concurrent operations of the permitted control devices CD-1 (hydrosonic scrubber) and CD-21 (wet tray scrubber with mercury modules). The section of CD-21 that controls mercury emissions uses a sorbent polymer catalyst composite material. The proposed CD-22 will essentially be a combined unit that includes similar controls of CD-1 and CD-21. In fact, CD-22 contains the same sorbent polymer catalyst composite material as CD-21. The Permittee has stated that the new CD-22 may have a higher control efficiency than

⁴ Section 2.2 Sewage Sludge Incineration, AP-42, 1/95.

⁵ “City of Greensboro-Thomas Z. Osborne POTW, McLeansville, Guilford County, North Carolina, 40 CFR 62 Subpart LLL Testing on Fluidized Bed Sewage Sludge Incinerator ES-1 and Fugitive Emissions on the ES-1 Ash Handling System, Facility No. 41/00923, Air Permit No. 04489T23, Conducted October 20, 2016, Tracking No. 2016-282st”, James Hammond, Stationary Source Compliance Branch, NCDAQ, February 28, 2017, and applicant provided Excel spreadsheet on “2016 ES-01 Emissions Test Results”.

⁶ Id.

⁷ Id.

⁸ Id.

the previous equipment configuration and the October 20, 2016 emissions testing data is the best available data for the proposed control equipment configuration to be installed for FBI No. 1. Thus, the Permittee had opted to estimate emissions for specific pollutants for the control scenario using the above referenced test data.

Regulatory Applicability

The FBI No. 1 (ES-1) is subject to the requirements in 15A NCAC 02D .0516, .0524, .1110 and .1204, and 02Q .0315 and .0317, and 40 CFR 503 Subpart E. They are discussed below:

15A NCAC 02D .0516 “Sulfur Dioxide Emissions from Combustion Sources”

Sulfur dioxide emissions from the FBI No. 1 are subject to an emission limit of 2.3 lb/million Btu when firing natural gas or No. 2 fuel oil or destroying sewage sludge. The actual measured emission rate for the incinerator is 0.109 lb/million Btu based on the stack test data⁹. Compliance is expected. The proposed Venturi Pak scrubber is designed to reduce SO₂ emissions from the FBI No. 1 substantially.

Since the margin of compliance is large and relatively clean auxiliary fuels are burned in the source, the DAQ believes that no monitoring including record keeping and reporting is justified to ensure compliance.

15A NCAC 02D .0524 “New Source Performance Standards”

The existing FBI No. 1 (ES-1) is subject to the requirements in Part 60 Subpart O “Standards of Performance for Sewage Sludge Treatment”. They are discussed below:

Standard of Particulate Matter [§60.152]

The owner/operator shall not emit particulate matter more than 0.65 g/kg dry sludge input (1.30 lb/ton dry sludge input) and any gases at or in excess of 20 percent opacity.

Monitoring [§60.153]

- The Permittee shall install, calibrate, maintain, and operate a flow measuring device which can be used to determine either the mass or volume of sludge charged to the incinerator. The flow measuring device shall be certified by the manufacturer to have an accuracy of ± 5 percent over its operating range. Except as provided in paragraph (d) of §60.153, the flow measuring device shall be operated continuously and data recorded during all periods of operation of the incinerator.
- The Permittee shall provide access to the sludge charged so that a well-mixed representative grab sample of the sludge can be obtained.
- The Permittee shall install, calibrate, maintain and operate a monitoring device that continuously measures and records the pressure drop of the gas flow through the wet scrubbing device. The device used to monitor scrubber pressure drop shall be certified by the manufacturer to be accurate within ± 250 pascals (± 1 inch water gauge) and shall be calibrated on an annual basis in accordance with the manufacturer's instructions.
- The Permittee shall install, calibrate, maintain and operate a monitoring device that continuously measures and records the oxygen content of the incinerator exhaust gas. The oxygen monitor shall be located upstream of any rabble shaft cooling air inlet into the incinerator exhaust gas stream, fan, ambient air recirculation damper, or any other source of dilution air. The oxygen monitoring device shall be certified by the manufacturer to have a relative accuracy of ± 5 percent over its operating range and shall be calibrated according to method(s) prescribed by the manufacturer at least once each 24-hour operating period.
- The Permittee shall install, calibrate, maintain and operate temperature measuring devices in the bed (combustion chamber) and outlet (freeboard) of fluidized bed incinerators. Each temperature measuring device shall be certified by the manufacturer to have

⁹ Id.

an accuracy of ± 5 percent over its operating range. Except as provided in paragraph (d) of §60.153, the temperature monitoring devices shall be operated continuously and data recorded during all periods of operation of the incinerator.

- The Permittee shall install, calibrate, maintain and operate a device for measuring the fuel flow to the incinerator. The flow measuring device shall be certified by the manufacturer to have an accuracy of ± 5 percent over its operating range. Except as provided in paragraph (d) of §60.153, the fuel flow measuring device shall be operated continuously and data recorded during all periods of operation of the incinerator.
- Except as provided in paragraph (d) of §60.153, the Permittee shall collect and analyze a grab sample of the sludge fed to the incinerator once per day. The dry sludge content and the volatile solids content of the sample shall be determined in accordance with the method specified under §60.154(b)(5), except that the determination of volatile solids, step (3)(b) of the method, may not be deleted.
- The Permittee shall retain the following information and make it available for inspection by the DAQ Director for a minimum of 2 years.
 - a record of the measured pressure drop of the gas flow through the wet scrubbing device as required by paragraph (b)(1) of §60.153.
 - a record of the measured oxygen content of the incinerator exhaust gas as required by paragraph (b)(2) of §60.153.
 - a record of the rate of sludge charged to the incinerator, the measured temperatures of the incinerator, the fuel flow to the incinerator, and the total solids and volatile solids content of the sludge charged to the incinerator, as required by paragraphs (a)(1), (b)(3), (b)(4), and (b)(5) of §60.153.
- The Permittee is not required to perform the following monitoring and record keeping if the PM emissions measured during the performance test conducted to demonstrate compliance with the standard in §60.152 are less than or equal to 0.38 g/kg dry sludge input (0.75 lb/ton dry sludge input).
 - Continuous operation of monitoring devices for sewage sludge flow rate, temperatures in combustion chamber and freeboard of FBI, and fuel flow rate.
 - Daily sampling and analysis of sludge feed
 - Record keeping for the sludge charged to the FBI, measured temperatures of FBI, fuel flow to the FBI, and the total solids and volatile solids content of the sludge charged to the incinerator.

The Permittee has provided the stack test measured data for PM emissions for FBI No. 1 (ES-1) as follows:

0.032 lb/ton (2010 stack test)
0.132 lb/ton (2016 stack test)

Similarly for the second FBI (ES-20), the most recent data provided by the Permittee for PM emissions are as follows:

0.061 lb/ton (2019 stack test)
0.059 lb/ton (2020 stack test)

The DAQ believes that the above recent stack test data (as compared to the initial performance test data circa 1993-1994) are more representative of the ES-1 FBI's current operation; thus it will accept them. The DAQ also accepts the most recent stack test data for PM for the ES-20 FBI. Based on these data, the DAQ believes that all the above described monitoring and record keeping shall not be required for each of these SSIs. The DAQ will revise the current permit accordingly.

Testing [§60.154]

The Permittee is required to perform a stack test as required in §60.8 and in accordance with applicable reference test methods in Appendix A to Part 60. The Permittee has demonstrated compliance with PM standard circa 1993/1994.

Reporting [§60.155]

- The Permittee shall submit the following report semi-annually containing the following:
 - A record of average scrubber pressure drop measurements for each period of 15 minutes duration or more during which the pressure drop of the scrubber was less than, by a percentage specified below, the average scrubber pressure drop measured during the most recent performance test. The percent reduction in scrubber pressure drop for which a report is required shall be determined as follows:
 - ✓ For incinerators that achieved an average particulate matter emission rate of 0.38 kg/Mg (0.75 lb/ton) dry sludge input or less during the most recent performance test, a scrubber pressure drop reduction of more than 30 percent from the average scrubber pressure drop recorded during the most recent performance test shall be reported.

These compliance values for pressure drop across the currently permitted control devices (CD-1 and CD-21) on FBI No. 1 (ES-1) have been established in the permit, but with the installation of new control devices (CD-22) the average pressure drop will be established for this control device through the stack testing after its installation.

- ✓ For incinerators that achieved an average particulate matter emission rate of greater than 0.38 kg/Mg (0.75 lb/ton) dry sludge input during the most recent performance test, a percent reduction in pressure drop greater than that calculated according to the following equation shall be reported:

$$P = -111E + 72.15$$

where P = Percent reduction in pressure drop, and
E = Average particulate matter emissions (kg/megagram)

This requirement does not apply at this time as the measured PM emission rate during the most recent performance test (0.132 lb/ton, October 2016) is well below 0.75 lb/ton.

- A record of average oxygen content in the incinerator exhaust gas for each period of 1-hour duration or more that the oxygen content of the incinerator exhaust gas exceeds the average oxygen content measured during the most recent performance test by more than 3 percent.

The average oxygen content in the incinerator (ES-1) exhaust, measured during the most recent performance test (October 2016), is 7.6% O₂. Thus, the current permit includes a demarcation of 10.6% O₂ (3 percent above 7.6% O₂) concentration in the exhaust gases for reporting purposes.

Modification [§60.14] and Reconstruction [§60.15]

- With regard to the modification provision in §60.14, it should be stated here that no physical or operational changes to any existing SSIs (ES-1, ES-20) are being planned for or requested in this application; thus, it is deemed that the existing SSIs are NOT “modified”.
- With respect to the “reconstruction” provision in §60.15, there are no components being replaced for the SSIs (ES-1, Es-20); thus, they are deemed NOT “reconstructed”.

15A NCAC 02D .1110 “National Emission Standard for Hazardous Air Pollutants”

The FBI No. 1 (ES-1) is subject to the requirements of Part 61 Subpart C “National Emission Standard for Beryllium” and Subpart E “National Emission Standard for Mercury”. The incinerator is subject to the following emissions standards:

Beryllium: 10 grams (0.022 lb) per 24-hour period [§61.32(a)]
Mercury: 3.2 kg (7.1 lb) per 24-hour period [§61.52(b)]

Stack Testing

The FBI No. 1 (ES-1) has performed the performance tests under Subparts C and E for beryllium and mercury emissions circa 1993/1994 as per the applicant and presumed to have demonstrated compliance with the above emissions standards.

Monitoring

Subpart C does not require monitoring for beryllium emissions. Thus, in accordance with §70.6(a)(3)(i)(B), the DAQ must provide in the permit periodic testing or monitoring to ensure compliance.

The FBI No. 1 (ES-1) is subject to the annual testing requirement for beryllium emissions to demonstrate continuous compliance with the requirements in 02D .1204 (40 CFR 60 Subpart MMMM) as discussed separately in this application review. The DAQ deems this periodic testing (annual) for beryllium emissions under 02D .1204 sufficient to ensure compliance with the Part 61 Subpart C standard. Thus, no additional monitoring shall be required.

With regard to Subpart E, the NESHAP includes conditional monitoring requirement on a once per year basis in the form of stack testing or sludge sampling if the mercury emissions measured during the (initial) performance test (or sludge sampling) exceed 3.5 lb/24-hour period.

The measured mercury emissions data for the (initial) performance test (circa 1993/1994) are not available. However, the Permittee has provided the stack tests data for the recent tests for the (ES-1) as follows:

0.030 lb/24-hour period (2010 stack test)
0.021 lb/24-hour period (2016 stack test)

Similarly for the second FBI (ES-20), the most recent data provided by the Permittee for mercury emissions are as follows:

0.026 lb/24-hour period (2019 stack test)
0.021 lb/24-hour period (2020 stack test)

The DAQ believes that the above recent stack test data (as compared to the initial performance test data) are more representative of the ES-1 FBI's current operation; thus it will accept them. The DAQ also accepts the mercury emissions data for the most recent stack tests for the ES-20 FBI as well. Based on these data, the DAQ believes that no monitoring as described above shall apply for mercury emissions for each of the SSIs under Subpart E of Part 61. Thus, based on §70.6(a)(3)(i)(B), the DAQ must provide periodic testing or monitoring for this applicable requirement. Both SSIs (ES-1 and ES-20) are subject to the annual testing requirement for mercury emissions to demonstrate continuous compliance with the requirements in 02D .1204 (40 CFR 60 Subpart MMMM). The DAQ deems this periodic testing (annual) for mercury emissions under 02D .1204 sufficient to ensure compliance with the Part 61 Subpart E standard. No additional monitoring shall be required.

In summary, the current permit will be revised with regard to Subparts C and E to include the above streamlined monitoring requirements for beryllium and mercury emissions. Moreover, it should be noted that with regard to the modification provision in §61.15, no physical or operational changes to any existing SSIs (ES-1, ES-20) are being planned for or requested in the application; thus, it is deemed that the existing SSIs are NOT "modified".

15A NCAC 02D .1204 "Sewage Sludge Incineration Units"

The DAQ has recently incorporated in 15A NCAC 02D .1204 the emission guideline (EG) for the existing sewage sludge incinerator units (40 CFR 60 Subpart MMMM). The revised 02D .1204 implementing this EG replaces the existing federal plan requirement in 40 CFR Subpart LLL, as included in Section 2.1.A.8. of the current permit. The following section includes the discussions on regulatory requirements in 02D .1204, especially with regard to the EG requirements. Thus, the revised permit will include in Section 2.1.A.6. all applicable requirements for the existing SSIs in accordance with 02D .1204 and exclude the federal plan requirements in entirety in Section 2.1.A.8.

Per 02D .1204(b), when the provisions of this Rule and provisions of 15A NCAC 02D .0524, .1110, or .1111 or provisions of 40 CFR Part 61, Subpart C; 40 CFR Part 61, Subpart E; or 40 CFR Part 503, Subpart E, regulate the same pollutant, the provisions of the more restrictive standards established shall apply, notwithstanding the provisions of 15A NCAC 02D .0524, .1110, or .1111 or provisions of 40 CFR Part 61, Subpart C; 40 CFR Part 61, Subpart E; or 40 CFR Part 503, Subpart E to the contrary.

Emissions Standards [02D .1204(e)]

- The Permittee shall meet the emission limits and standards specified below by March 21, 2016 (i.e., the final compliance date).
 - Emissions of particulate matter from a sewage sludge incineration unit shall meet the requirements established in 40 CFR 60.5165 or 40 CFR 60.152, whichever is more restrictive, as below:

18 milligrams per dry standard cubic meter or 1.3 lbs per ton of dry sludge
 - Fugitive emissions from a sewage sludge incineration unit ash handling process shall meet the requirements established in 40 CFR 60.5165 as below:

Visible emissions of combustion ash from an ash conveying system (including conveyor transfer points) shall be no more than 5 percent of the hourly observation period.

All other visible emissions from a sewage sludge incineration unit shall comply with 15A NCAC 02D .0521. However, it should be noted that since the SSI is subject to NSPS Subpart O for PM standard (including 20 percent opacity) in Section 2.1.A.3.b. of the current permit, the requirements in 02D .0521 cannot apply.
 - Emissions of hydrogen chloride from a sewage sludge incineration unit shall meet the requirements established in 40 CFR 60.5165 as below:

0.51 parts per million by dry volume
 - Emissions of carbon monoxide (CO) from a sewage sludge incineration unit shall meet the requirements established in 40 CFR 60.5165 as below:

64 parts per million by dry volume
 - Emissions of dioxin and furan (total mass basis) from a sewage sludge incineration unit shall meet the requirements established in 40 CFR 60.5165 as below:

1.2 nanograms per dry standard cubic meter
 - Emissions of dioxin and furan (toxic equivalency basis) from a sewage sludge incineration unit shall meet the requirements established in 40 CFR 60.5165.

0.10 nanograms per dry standard cubic meter
 - Emissions of mercury from a sewage sludge incineration unit shall meet the requirements established in 40 CFR 60.5165 and in 40 CFR 61.52(b) as referenced in 15A NCAC 02D .1110(a), (d), and (e), whichever is more restrictive.

0.037 milligrams per dry standard cubic meter or 3.2 kg (7.1 lb) of mercury per 24-hour period
 - Emissions of nitrogen oxides from a sewage sludge incineration unit shall meet the requirements established in 40 CFR 60.5165 as below:

150 parts per million by dry volume
 - Emissions of sulfur dioxide from a sewage sludge incineration unit shall meet the requirements established in 40 CFR 60.5165 as below:

15 parts per million by dry volume
 - Emissions of cadmium from a sewage sludge incineration unit shall meet the requirements established in 40 CFR 60.5165 as below:

0.0016 milligrams per dry standard cubic meter

- Emissions of lead from a sewage sludge incineration unit shall meet the requirements established in 40 CFR 60.5165 as below:

0.0074 milligrams per dry standard cubic meter

In addition, the daily concentration of lead in sewage sludge fed to a sewage sludge incinerator shall be less than the maximum limit established in 40 CFR 503.43(c) as below:

1,382 mg/kg

- Emissions of beryllium from a sewage sludge incineration unit shall meet the requirements established in 40 CFR 61.32(a) through (c) as referenced in 15A NCAC 02D .1110(a), (d), and (e).

10 grams (0.022 lb) of beryllium over a 24-hour period

- The average daily concentration of arsenic, cadmium, chromium, and nickel in sewage sludge fed to a sewage sludge incinerator shall be less than the maximum limits established for each in accordance with 40 CFR 503.43(d) as below:

513 mg/kg (arsenic)

7,231 mg/kg (cadmium)

9,614 mg/kg (chromium)

2,051 mg/kg (nickel)

- Emissions of toxic air pollutants from a sewage sludge incineration unit shall meet the requirements specified in 15A NCAC 02D .1100 in accordance with 15A NCAC 02Q .0700.

It should be noted that the SSI is subject to Part 61 NESHAP (Subparts C and E); thus, this incinerator is not subject to the state air toxics program per 02Q .0702(a)(27)(A).

- The monthly average concentration for total hydrocarbons or carbon monoxide, as provided in 40 CFR 503.40(c), in the exit gas from a sewage sludge incinerator stack, corrected to zero percent moisture and seven percent oxygen as specified in 40 CFR 503.44, shall not exceed 100 parts per million on a volumetric basis using the continuous emission monitoring required in Paragraph (l) of 02D .1204.

It should be noted that the Permittee has demonstrated compliance with all above emissions standards except SO₂ in accordance with the performance test conducted on October 20, 2016¹⁰ as below in Table 5-3. For SO₂, the installation of a new scrubber and its performance verification through stack testing will provide compliance assurance. As stated above, the new scrubber manufacturer has provided a guarantee that it is designed to meet the SO₂ standard (in addition to other pollutant standards) under Part 60 Subpart M.

Table 5-3 Measured Emissions Rates

Pollutant	Measured Emission Rate	Emission Limit	Compliance
Filterable PM	9.4 mg/dscm ¹	18 mg/dscm ¹	Yes
	0.132 lb/ton	1.3 lb/ton	Yes
Fugitive Emissions	0%	5% of any hourly period	Yes
HCl	0.027 ppmvd ¹	0.51 ppmvd ¹	Yes
CO	29.32 ppmvd ¹	100 ppmv ¹ (monthly average)	Yes

¹⁰ Id.

Pollutant	Measured Emission Rate	Emission Limit	Compliance
		64 ppmvd ¹	Yes
Dioxins/Furans	0.221 ng/dscm ¹	1.2 ng/dscm ¹ (total)	Yes
	0.006 ng/dscm ¹	0.10 ng/dscm ¹ (TEQ)	Yes
Hg	0.0281 mg/dscm ¹	0.037 mg/dscm ¹	Yes
	0.021 lb/day	7.1 lb/day	Yes
NO _x	22.52 ppmvd ¹	150 ppmvd ¹	Yes
SO ₂	47.62 ppmvd ¹	15 ppmvd ¹	No
Cd	0.00035 mg/dscm ¹	0.0016 mg/dscm ¹	Yes
Pb	0.00076 mg/dscm ¹	0.0074 mg/dscm ¹	Yes
Be	0.000019 lb/day	0.022 lb/day	Yes

¹ = corrected to 7% O₂, dry basis.

Operating Limits [02D .1204(f)]

- The Permittee shall meet the operating limits and requirements specified in 40 CFR 60.5170 including Subparagraphs (a) through (d) and (h) according to the schedule specified in 40 CFR 60.5170(e). They are as follows:

The Permittee shall meet a site-specific operating limit for minimum operating temperature of the combustion chamber (or afterburner combustion chamber) of the SSI that he/she establishes through the initial performance test in §60.5190.

The Permittee shall meet the site-specific operating limits for each operating parameter associated with each air pollution control device (i.e., new wet scrubber) that he/she establishes through the initial performance test in §60.5190.

The Permittee shall meet the operating requirements in the site-specific fugitive emission monitoring plan, submitted as specified in §60.5200(d) to ensure that the ash handling system will meet the emission standard for fugitive emissions from ash handling.

If the Permittee uses an air pollution control device other than a wet scrubber, fabric filter, electrostatic precipitator, or activated carbon injection to comply with the emission limits specified above, the Permittee shall meet any site-specific operating limits or requirements that he/she establishes pursuant to §§60.5170(h) and 60.5175.

- The Permittee shall meet the operating limits and requirements specified in 40 CFR 60.5170 including Subparagraphs (a) through (d) by March 21, 2016.
- The Permittee shall monitor the feed rate and moisture content of the sewage sludge fed to the sewage sludge incinerator, as specified in 40 CFR 60.5170(f)(1) and (f)(2).
- For the operating requirements in 40 CFR 60.5170(a) through (d) and (h), the Permittee shall meet any new operating limits, re-established in accordance with 40 CFR 60.5210.

General [02D .1204(g)]

- Emission standards and operational limits established in 02D .1204(e) and (f) above shall apply at all times that sewage sludge is in the combustion chamber before the sewage sludge feed to the combustor is cut off for a period of time not less than the sewage sludge incineration residence time and during periods of malfunction as specified in 40 CFR 60.5180.

Initial Compliance [02D .1204(h)]

- The compliance with the emissions standards in 02D .1204(e) shall be demonstrated by using the procedures specified in 40 CFR 60.5185(a) through (e).

It is DAQ's understanding that using the October 20, 2016 stack test, conducted previously to comply with the federal plan (Part 62 Subpart LLL), and associated results approved by DAQ, as discussed above, the Permittee may be able to satisfy the initial compliance requirements for various emissions standards except SO₂, to meet the state plan requirement in 02D .1204(h).

- The Permittee shall establish site-specific operating limits specified in 02D .1204(f) in accordance with the requirements specified 40 CFR 60.5190(a) through (e).

The DAQ believes that the October 20, 2016 stack test results, complying with the then-applicable federal plan meets the state plan requirement for establishing the operating limit for the existing sewage sludge incinerator (ES-1) as below in Table 5-4. For the new wet scrubber (CD-22), the operating limits will be established as below:

Table 5-4 Operating Limits		
Source or Control Device	Operating Parameter/Operating Requirement	Operating Limit
Sewage Sludge Incinerator (ID No. ES-1)	minimum combustion chamber operating temperature	1,577°F
Wet Scrubber (ID No. CD-22)	site-specific operating limits per §§60.5170(b) and 60.5190 and §§60.5170(h) and 60.5175	-

The Permittee will be required to either confirm the above operating limits (and operating requirements in the site-specific fugitive emissions monitoring plan) or reestablish the operating limits (and operating requirements in the site-specific fugitive emissions monitoring plan) pursuant to §60.5210(d). In addition, the Permittee will be required to confirm the site-specific operating limits or requirements for the sorbent polymer catalyst adsorber portion of the new wet scrubber (CD-22), established per §§60.5170(h) and 60.5175. The Permittee also has an option to reestablish the operating limits or requirements for this control device as well.

Any confirmation or reestablishment of operating limits (and operating requirements in the site-specific fugitive emissions monitoring plan) may require a permit revision.

- The Permittee shall conduct the initial air pollution control device inspection specified 40 CFR 60.5220(c) by the date established in accordance with 40 CFR 60.5195(a). The Permittee shall complete all necessary repairs in accordance with 40 CFR 60.5195(b).
- The Permittee shall develop a site-specific monitoring plan for continuous monitoring, bag leak detection, ash handling systems, and an initial performance evaluation date, as applicable, in accordance with the requirements specified in 40 CFR 60.5200(a) and (d) through (h).

Continuous Compliance Requirements [02D .1204(i)]

- The Permittee shall demonstrate compliance with the emissions standards in 02D .1204(e) above as follows:
 - By demonstrating continuous compliance as specified in 40 CFR 60.5205(a) through (f).
 - By demonstrating continuous compliance with the operating limits as specified in 40 CFR 60.5210(a)(1) and (b) through (d).
 - By demonstrating continuous compliance with the total hydrocarbon concentration of the incinerator stack exit gas according to 40 CFR 503.45(a) unless the requirements for continuously monitoring carbon monoxide as provided in 40 CFR 503.40(c) are satisfied.
 - By demonstrating continuous compliance with the oxygen content of the incinerator stack exit gas as provided in 40 CFR 503.45(b).

- By demonstrating continuous compliance with the moisture content of the incinerator stack exit gas as provided in 40 CFR 503.45(c).
- By conducting an annual air pollution control device inspection as specified in 40 CFR 60.5215(a).
- By making all necessary repairs within the time periods specified in 40 CFR 60.5215(b).
- By monitoring the concentration of beryllium and mercury from the sewage sludge fed to the incinerator as frequently as specified in 40 CFR 503.46(a)(1).
- By monitoring the concentrations of arsenic, cadmium, chromium, lead, and nickel in the sewage sludge fed to the incinerator as frequently as specified in 40 CFR 503.46(a)(2) and (3).

Performance Testing, Monitoring, and Calibration Requirements [02D .1204(j)]

- The Permittee shall demonstrate compliance with the emissions standards as specified above in 02D .1204(e) as follows:
 - By meeting the performance testing requirements specified in 40 CFR 60.5220(a)(1) through (11), 40 CFR 61.53(d) or 40 CFR 61.54, 40 CFR 503.43(e), and 40 CFR 61.33.
 - By meeting the monitoring requirements specified in 40 CFR 60.5220(b)(1) through (7), 40 CFR 61.55, 40 CFR 503.45, 40 CFR 503.46; and 40 CFR 60.153.
 - By performing the air pollution control device inspection requirements specified in 40 CFR 60.5220(c)(1) through (3).
 - By meeting the bypass stack provisions specified in 40 CFR 60.5220(d).

Continuous Parameter Monitoring Systems [02D .1204(k)]

- The Permittee shall install, operate, calibrate, and maintain the continuous parameter monitoring systems to ensure compliance with the operational limits set forth in 02D .1204(f) above, as specified in 40 CFR 503.45, 40 CFR 60.5225 (a)(1), (2), and 40 CFR 60.153.

Recordkeeping [02D .1204(l)]

- The Permittee shall maintain on site in either paper copy or electronic format that can be printed upon request for a period of five years the following:
 - the calendar date of each record as specified in 40 CFR 60.5230(a).
 - increments of progress as specified in 40 CFR 60.5230(b).
 - operator training records as specified in 40 CFR 60.5230(c)(1) through (4).
 - air pollution control device inspections as specified in 40 CFR 60.5230(d).
 - performance test reports as specified in 40 CFR 60.5230(e)(1) through (4).
 - continuous monitoring data as specified in 40 CFR 60.5230(f)(1) through (3) and 40 CFR 60.153.
 - other records for continuous monitoring systems as specified in 40 CFR 60.5230(g)(1) through (3) and 40 CFR 60.153.
 - deviation reports as specified in 40 CFR 60.5230(h).
 - equipment specifications and operation and maintenance requirements as specified in 40 CFR 60.5230(i).
 - inspections, calibrations, and validation checks of monitoring devices as specified in 40 CFR 60.5230(j).
 - monitoring plan and performance evaluations for continuous monitoring systems as specified in 40 CFR 60.5230(k).
 - records indicating use of the bypass stack as specified in 40 CFR 60.5230(m).
 - malfunction occurrence records as specified in 40 CFR 60.5230(n).
 - records showing compliance with standards for the use or disposal of sewage sludge listed in 40 CFR 503.47(b) through (n).

Reporting [02D .1204(l)]

- The Permittee shall submit to the Director in the format specified in 40 CFR 60.5235(h)(1) and by due dates established in Table 6 of 40 CFR Part 60 Subpart M the following:
 - the initial compliance report as specified in 40 CFR 60.5235(b).
 - the annual compliance report as specified in 40 CFR 60.5235(c).
 - the deviation reports (deviations from emission limits, emission standards, or operating limits, as specified in 40 CFR 60.5235(d)(1)) when it is required by 40 CFR 60.5235(d).

- the notification of qualified operator deviation and notification of status of qualified operator deviation as specified in 40 CFR 60.5235(e)(1).
- the notification of resumed operation pursuant to 40 CFR 60.5155(b)(2)(i) following shutdown (due to qualified operator deviation) as specified in 40 CFR 60.5235(e)(2).
- the notification of a force majeure as specified in 40 CFR 60.5235(f).
- the notification of intent to start or stop use of a continuous monitoring system, notification of intent to conduct a performance test, and notification of intent to conduct a rescheduled performance test as specified in 40 CFR 60.5235(g).
- the performance test relative accuracy audit data (test reference method) and performance test data in the manner specified in 40 CFR 60.5235(h)(2).
- the semiannual reports as specified in 40 CFR 60.155.

Operator Training and Qualification [02D .1204(m)]

- A sewage sludge incineration unit subject to this Rule shall not be operated unless a fully trained and qualified sewage sludge incineration unit operator is at the facility or can be at the facility within one hour. The trained and qualified sewage sludge incineration unit operator may operate the sewage sludge incineration unit directly or be the direct supervisor of one or more other plant personnel who operate the unit. If all qualified sewage sludge incineration unit operators are temporarily not accessible, the procedures in 40 CFR 60.5155 shall apply.
- Operator training and qualification shall be obtained by completing the requirements specified in 40 CFR 60.5130(c).
- The Permittee shall complete an annual review or refresher course covering the five topics specified in 40 CFR 60.5145(a) through (e) to maintain an operator qualification.
- The owner or operator of a sewage sludge incineration unit subject to this Rule shall renew a lapsed operator qualification before he or she begins operation of the unit by one of the two methods specified in 40 CFR 60.5150(a) and (b).
- When a qualified operator of a sewage sludge incineration unit subject to this Rule is not at the facility and cannot be at the facility within one hour, the owner shall meet the criteria specified in 40 CFR 60.5155.
- The owner or operator of a sewage sludge incineration unit subject to this Rule shall maintain and review the operator training documentation as specified in 40 CFR 60.5160 (a) and (b).

Final compliance [02D .1204(n)]

- The Permittee shall achieve final compliance by the dates specified in 40 CFR 60.5035(a) or (b). The final compliance date is March 21, 2016.

40 CFR 503 Subpart E “Incineration”

The existing SSIs at City of Greensboro’s T Z Osborne WWTP are subject to the requirements of 40 CFR 503 Subpart E “Incineration”. Per §503.40(a), this Subpart includes requirements for owner/operator of a SSI, SSI, and sewage sludge.

§503.40(a)(2), the management practice in §503.45(a), the frequency of monitoring requirement for total hydrocarbon concentration in §503.46(b) and the recordkeeping requirements for total hydrocarbon concentration in §503.47(c) and (n) do not apply if the following conditions are met:

- The exit gas from a sewage sludge incinerator stack is monitored continuously for carbon monoxide.
- The monthly average concentration of carbon monoxide in the exit gas from a sewage sludge incinerator stack, corrected for zero percent moisture and to seven percent oxygen, does not exceed 100 parts per million on a volumetric basis.
- The person who fires sewage sludge in a sewage sludge incinerator retains the following information for five years:
 - The carbon monoxide concentrations in the exit gas; and

- A calibration and maintenance log for the instrument used to measure the carbon monoxide concentration.
- Class I sludge management facilities, POTWs (as defined in 40 CFR 501.2) with a design flow rate equal to or greater than one million gallons per day, and POTWs that serve a population of 10,000 people or greater submit the monthly average carbon monoxide concentrations in the exit gas to the permitting authority on February 19 of each year.

Based on the current permit, both SSIs are subject to CO emission standard of 100 ppm (monthly average) and all associated monitoring, recordkeeping and reporting requirements. Thus, the management practice in §503.45(a), the frequency of monitoring requirement for total hydrocarbon concentration in §503.46(b), and the recordkeeping requirements for total hydrocarbon concentration in §503.47(c) and (n) do not apply.

Pollutant Limits [§503.43]

Based on the current permit, average daily concentration limits (mg/kg) for lead (Pb), arsenic (Ar), cadmium (Cd), chromium (Cr), and nickel (Ni) in the sludge fed to the existing SSIs shall not exceed the limits included in Table 5-5 below:

Pollutant	Average Daily Concentration mg/kg
Lead	1,382
Arsenic	513
Cadmium	7,231
Chromium	9,614
Nickel	2,051

The above limits for different pollutants are based upon a dispersion factor and control efficiencies determined previously for the permitted control devices on each SSI, among other factors, consistent with §503.43(c) and (d).

In accordance with §503.43(e)(5), significant changes in geographic or physical characteristics at the incinerator site or in incinerator operating conditions require the owner/operator to conduct a new air dispersion modeling or performance testing for determining a new dispersion factor or a new control efficiency, and calculate the revised limits for the above pollutants.

As described in this application review, the emissions control for the SSI ES-1 is changing with the installation of a new scrubber (CD-22) and elimination of pollutant discharge of ES-1 to the existing scrubber CD-21. Therefore, in future, after the installation of CD-22 control device, the Permittee will be required to conduct a new dispersion modeling and performance testing to determine a new dispersion factor and a new control efficiency for each of these pollutants, and revise the above concentration limits.

Management Practice [§503.45]

- The Permittee is required to install a monitor to continuously measure and record the oxygen concentration in the SSI stack exit gas. The monitor shall be calibrated, operated and maintained. [§503.45(b)]
- The Permittee is required to install a monitor to continuously measure and record information to determine moisture content in the SSI of the stack exit gas. The monitor shall be calibrated, operated and maintained. [§503.45(c)]
- The Permittee is required install a monitor to continuously measure and record the combustion temperatures for an SSI. The monitor shall be calibrated, operated and maintained. [§503.45(d)]
- The Permittee shall operate the SSI such that the operating temperatures in the combustion chamber and the freeboard shall not exceed by 20 percent of the respective combustion chamber and freeboard temperatures measured during a performance test. [§503.45(e)]
- For sewage sludge incinerators subject to the requirements in Subpart O of 40 CFR part 60, operation of the air pollution control device shall not violate the requirements for the air pollution control device in Subpart O of 40 CFR Part 60. [§503.45(f)]

Frequency of Monitoring [§503.46]

- The frequency of monitoring for beryllium shall be as required in Subpart C of 40 CFR part 61, and for mercury as required in Subpart E of 40 CFR part 61. [§503.46(a)(1)]

It should be noted that Subpart C to Part 61 does not include any monitoring for beryllium emissions from ES-1 SSI. In addition, the mercury emissions monitoring (once per year) per Subpart E of Part 61 is not required for the ES-1 SSI (as actual emissions as demonstrated in the performance test in 2016 are less than 3.5 lbs/24-hour period). Thus, the DAQ is required to provide periodic monitoring or testing for these pollutant emissions which may include record keeping, to meet the requirement in §70.6(a)(3)(i)(B). The DAQ believes that the annual testing requirement for both pollutants under Part 60 Subpart MMM as incorporated in 02D .1204 meets the periodic monitoring requirement and assures compliance with 40 CFR 503 Subpart E. No additional monitoring requirement shall apply for beryllium or mercury emissions under this Subpart.

- The frequency of monitoring for arsenic, cadmium, chromium, lead, and nickel in sewage sludge fed to a sewage sludge incinerator shall be once per month (12 times per year). [§503.46(a)(2) and Table 1 of §503.46]
- The Permittee shall measure continuously oxygen concentration in the exit gas from a sewage sludge incinerator stack, the information used to measure moisture content in the exit gas, and the combustion temperatures for the sewage sludge incinerator. [§503.46(b)]
- The frequency of monitoring for the appropriate operating parameters for the control devices installed on the SSIs shall be in accordance with the requirements in Part 60 Subpart O. [§503.46(c)]

The Subpart O of Part 60 requires that the pressure drop of the gas flow through the wet scrubbing device shall be measured continuously.

Recordkeeping [§503.47]

The Permittee is required to retain the following information for five years (from the date of collection or development of such information) for each SSI:

- The concentration of lead, arsenic, cadmium, chromium, and nickel in the sewage sludge fed to the sewage sludge incinerator.
- Information that indicates the requirements in the National Emission Standard for beryllium in Subpart C of 40 CFR part 61 are met.
- Information that indicates the requirements in the National Emission Standard for mercury in Subpart E of 40 CFR part 61 are met.
- The operating combustion temperatures for the sewage sludge incinerator.
- Values for the air pollution control device operating parameters.
- The oxygen concentration and information used to measure moisture content in the exit gas from the sewage sludge incinerator stack.
- The sewage sludge feed rate.
- The stack height for the sewage sludge incinerator.
- The dispersion factor for the site where the sewage sludge incinerator is located.
- The control efficiency for lead, arsenic, cadmium, chromium, and nickel for each sewage sludge incinerator.
- The risk specific concentration for chromium calculated using equation (6) of Subpart E of 40 CFR 503, if applicable.

- A calibration and maintenance log for the instruments used to measure the oxygen concentration in the exit gas from the sewage sludge incinerator stack, the information needed to determine moisture content in the exit gas, and the combustion temperatures.

Recordkeeping [§503.48]

The Permittee is required to submit reports electronically by February 19th of each year.

15A NCAC 02Q .0315 “Synthetic Minor Facilities”

The following Table 5-6 provides a summary of the facility-wide potential emissions (PTE):

Table 5-6 Facility-wide PTE

	PM (tons/yr)		PM10 (tons/yr)		PM2.5 (tons/yr)		CO (tons/yr)	NOx (tons/yr)	SO ₂ (tons/yr)	SO ₂ (tons/yr)	VOC (tons/yr)	Lead (tons/yr)	Lead (tons/yr)	GHGs as CO ₂ e (tons/yr)	Single (largest) HAP (tons/yr)		Total HAPs (tons/yr)	
	Uncontrolled	Controlled	Uncontrolled	Controlled	Uncontrolled	Controlled	Uncontrolled	Uncontrolled	Uncontrolled	Controlled	Uncontrolled	Uncontrolled	Controlled	Uncontrolled	Uncontrolled	Controlled	Uncontrolled	Controlled
Sewage Sludge Incinerator (ES-1)	6,044	2.08	441	0.15	363	0.12	7.27	9.22	3.9	12.88	10.51	0.53	1.73E-04	32,374	6.31	6.31	12.42	10.01
Sewage Sludge Incinerator (ES-20)	6,548	1.04	478	0.08	393	0.06	6.83	15.37	4.3	5.98	11.39	0.57	3.50E-04	35,072	6.83	6.83	13.45	10.84
Sand Storage Silo (ES-17)	2.76E-04	2.76E-06	1.30E-04	1.30E-06	1.30E-04	1.30E-06	--	--	--	--	--	--	--	--	--	--	--	--
2,000 kW Emergency Generator	0.56	0.56	0.56	0.56	0.56	0.56	4.76	17.93	8.49E-03	8.49E-03	0.50	--	--	927.7	--	--	--	--
2,000 kW Emergency Generator	0.56	0.56	0.56	0.56	0.56	0.56	4.76	17.93	8.49E-03	8.49E-03	0.50	--	--	927.7	--	--	--	--
3,250 kW Emergency Generator	0.97	0.97	0.97	0.97	0.97	0.97	20.42	16.48	1.16E-02	1.16E-02	0.02	--	--	1,264	--	--	--	--
60 kW Emergency Generator (IES-16)	0.05	0.05	0.05	0.05	0.05	0.05	0.16	0.74	4.87E-02	4.87E-02	0.06	--	--	27.65	--	--	--	--
100 kW Emergency Generator (IES-3)	0.07	0.07	0.07	0.07	0.07	0.07	0.21	0.99	6.50E-02	6.50E-02	0.08	--	--	36.86	--	--	--	--
Boiler No. 1 (IES-4)	0.87	0.87	0.87	0.87	0.87	0.87	3.03	5.26	0.06	0.06	0.07	0.20	0.20	5,881	--	--	--	--
Boiler No. 2 (IES-20)	0.87	0.87	0.87	0.87	0.87	0.87	3.03	5.26	0.06	0.06	0.07	0.20	0.20	5,881	--	--	--	--
WWTP (IES)	--	--	--	--	--	--	--	--	--	--	1.87	--	--	--	--	--	--	--
15,000 gallon No. 2 fuel oil tank											3.15E-03							
12,000 gallon No. 2 fuel oil tank											2.51E-03							
11,000 gallon No. 2 fuel oil tank (IES-23)											2.32E-03							
TOTALS	12,596	7.07	923	4.17	759	4.13	50.5	89.18	8.47	19.11	25.07	1.10	5.24E-04	82,393	13.14	13.14	25.87	20.85

As per the facility wide PTE summary above, the potential emissions before control exceed the major source threshold of 100 tons/yr under Title V for both PM₁₀, and PM_{2.5}. With the use (operation) of control device (for example wet scrubbers on SSIs), the emissions are expected to be much less than the major source threshold. Thus, the operation of the control devices shall be treated as a part of its physical and operational design to limit the PTE to avoid Title V for each of the above pollutants. The limitation will be federally enforceable, which is meant to be legally enforceable (by the EPA, state agency, and private citizen) and practically enforceable (i.e., limitation needs to be technically accurate with monitoring/recordkeeping/reporting required to enforce upon). Similarly the HAP emissions for a single (largest) pollutant (1,4 dichlorobenzene) and aggregate pollutants exceed the respective 10 tons/yr and 25 tons/yr major source thresholds, respectively. Thus, limitations are also required for HAP emissions to avoid becoming a Title V source.

As discussed previously, the uncontrolled SO₂ emissions estimates for both SSIs are erroneous and they are expected to be much more than the controlled emissions rates of 12.88 tons/yr (ES-1) and 5.98 tons/yr (ES-20). For conservatism, it is assumed that a limitation for SO₂ emissions will also be required to avoid becoming a major source for this pollutant for TZ Osborne's stationary source.

Thus, as requested by the applicant, the emission limitations will be established for emissions of PM₁₀, PM_{2.5}, SO₂, single HAP (1,4 dichlorobenzene), and aggregate HAPs. It should be noted that no limitation is required to be established for PM emissions to avoid becoming a major source because PM is not a "regulated air pollutant" in the context of Title V program.

The objective for the applicant is to not become a "major source" under Title V so that it can avoid triggering the Compliance Assurance Monitoring (CAM) requirement under 02D .0614, which implements the requirements of 40 CFR 64 "Compliance Assurance Monitoring". However, it should be emphasized that the Permittee will continue to require holding a Title V permit due to the requirement of Part 60 Subpart MMMM in §60.5240, implementing the CAA §129. For clarity and certainty, especially for future permitting, a permit shield will be included for non-applicability with 02D .0614.

The following monitoring approach will be used for emissions of PM₁₀, PM_{2.5}, SO₂, 1, 4 dichlorobenzene (single HAP), and aggregate HAPs to ensure that the facility wide emissions do not exceed the major source thresholds. For the existing sewage sludge incinerators, emissions factors previously developed and discussed above will be used to require emissions calculations on a monthly basis. The applicant will be required to update the emissions factors through permit revisions on an annual basis using the stack test results of the annual performance testing required in 02D .1204. When adequate numbers of actual emissions rates measurements are available for various pollutants through annual performance tests (02D .1204), especially with the use (installation) of new scrubber (CD-22) on SSI (ES-1), the frequency for updating the emissions factors for this avoidance limitation can be reduced (from annual). For all other emissions units (other than two SSIs, which are sand storage silo, engines, and boilers), the default aggregated PTE shall be used to simplify the emissions calculations as below:

PM₁₀

PM₁₀ emissions, tons/month =
 [emission factor (lb/dry ton) for SSI (ES-1) * amount of sewage sludge charged (tons/month)]
 + [emission factor (lb/dry ton) for SSI (ES-20) * amount of sewage sludge charged (tons/month)]
 + [default total emission rate (ton/month) for all other permitted sources (ES-17, ES-18, ES-19, ES-23, IES-16, IES-3, IES-4, and IES-20)]

Where,

PM₁₀ emission factor for SSI (ES-1) = 0.010 lb/dry ton

PM₁₀ emission factor for SSI (ES-20) = 0.0045 lb/dry ton

Default PM₁₀ emission rate (aggregate) for all other permitted sources (ES-17, ES-18, ES-19, ES-23, IES-16, IES-3, IES-4, and IES-20) = 0.33 ton/month (3.94 tons/yr)

PM_{2.5}

PM_{2.5} emissions, tons/month =
 [emission factor (lb/dry ton) for SSI (ES-1) * amount of sewage sludge charged (tons/month)]
 + [emission factor (lb/dry ton) for SSI (ES-20) * amount of sewage sludge charged (tons/month)]
 + [default total emission rate (ton/month) for all other permitted sources (ES-17, ES-18, ES-19, ES-23, IES-16, IES-3, IES-4, and IES-20)]

Where,

PM_{2.5} emission factor for SSI (ES-1) = 0.0079 lb/dry ton

PM_{2.5} emission factor for SSI (ES-20) = 0.0037 lb/dry ton

Default PM_{2.5} emission rate (aggregate) for all other permitted sources (ES-17, ES-18, ES-19, ES-23, IES-16, IES-3, IES-4, and IES-20) = 0.33 ton/month (3.94 tons/yr)

SO₂

SO₂ emissions, tons/month =

[emission factor (lb/dry ton) for SSI (ES-1) * amount of sewage sludge charged (tons/month)]

+ [emission factor (lb/dry ton) for SSI (ES-20) * amount of sewage sludge charged (tons/month)]

+ [default total emission rate (ton/month) for all other permitted sources (ES-17, ES-18, ES-19, ES-23, IES-16, IES-3, IES-4, and IES-20)]

Where,

SO₂ emission factor for SSI (ES-1) = 0.98 lb/dry ton

SO₂ emission factor for SSI (ES-20) = 0.35 lb/dry ton

Default SO₂ emission rate (aggregate) for all other permitted sources (ES-17, ES-18, ES-19, ES-23, IES-16, IES-3, IES-4, and IES-20) = 0.021 ton/month (0.25 ton/yr)

Single HAP (1, 4 dichlorobenzene)

1,4 dichlorobenzene emissions, tons/month =

[emission factor (lb/dry ton) for SSI (ES-1) * amount of sewage sludge charged (tons/month)]

+ [emission factor (lb/dry ton) for SSI (ES-20) * amount of sewage sludge charged (tons/month)]

+ [default total emission rate (ton/month) for all other permitted sources (ES-17, ES-18, ES-19, ES-23, IES-16, IES-3, IES-4, and IES-20)]

Where,

1,4 dichlorobenzene emission factor for SSI (ES-1, ES-20) = 0.48 lb/dry ton

Default 1,4 dichlorobenzene emission rate (aggregate) for all other permitted sources (ES-17, ES-18, ES-19, ES-23, IES-16, IES-3, IES-4, and IES-20) = 0 ton/month

Aggregate HAP Emissions

Aggregate HAP emissions, tons/month =

[emissions factors (lb/dry ton) of 1,4 dichlorobenzene, naphthalene, and bis (2-ethylhexyl) phthalate for SSI (ES-1) * amount of sewage sludge charged (tons/month)] + [emissions factors (lb/dry ton) of 1,4 dichlorobenzene, naphthalene, and bis (2-ethylhexyl) phthalate for SSI (ES-20) * amount of sewage sludge charged (tons/month)] + [default total emission rate (ton/month) for 1,4 dichlorobenzene, naphthalene, and bis (2-ethylhexyl) phthalate for all other permitted sources (ES-17, ES-18, ES-19, ES-23, IES-16, IES-3, IES-4, and IES-20)]

Where,

1,4 dichlorobenzene emission factor for SSI (ES-1, ES-20) = 0.48 lb/dry ton

Naphthalene emission factor for SSI (ES-1, ES-20) = 0.19 lb/dry ton

Bis (2-ethylhexyl) phthalate emission factor for SSI (ES-1, ES-20) = 0.082 lb/dry ton

Default aggregate emission rate for 1,4 dichlorobenzene, naphthalene, and bis (2-ethylhexyl) phthalate for all other permitted sources (ES-17, ES-18, ES-19, ES-23, IES-16, IES-3, IES-4, and IES-20) = 0 ton/month

It needs to be noted that DAQ opted to include only three HAPs (i.e., 1,4 dichlorobenzene, naphthalene, and bis (2-ethylhexyl) phthalate) for the monitoring of aggregate HAPs emissions (to comply with less than 25 tons/yr limit), because as per the application, these pollutants' emissions collectively for each SSI equal to approximately 99 percent of the total HAPs emissions for each. The DAQ believes that the approach is reasonable and will simplify the monitoring for aggregate HAPs limit. The Permittee will be required to keep records of emissions calculations on a monthly basis and 12-months rolling average basis for each of the above pollutants, and the amount of sewage sludge charged to each incinerator on a monthly basis. The Permittee will be required to report facility-wide emissions and charging rates for SSIs on a semi-annual basis for each of the 6-months period.

15A NCAC 02Q .0317 “Avoidance of Prevention of Significant Deterioration”

The T Z Osborne WWTP is a 250 tons/yr category stationary source. As per the facility wide emissions summary included in the previous section, the potential emissions before control exceed this major stationary source threshold for PM, PM₁₀, and PM_{2.5}. With the use (operation) of control device (new wet scrubber), the emissions are expected to be much less than the major stationary source threshold. Thus, the limitation to avoid PSD is required for each of the above pollutants. The applicant has also requested avoidance limitation for SO₂.

The DAQ believes that the limitations established under the Title V program (discussed above), restricting emissions for PM₁₀, and PM_{2.5}, and SO₂ to less than 100 tons/yr each shall be sufficient to assure compliance with the avoidance of PSD for these pollutants. No additional requirements are justified for these pollutants under PSD.

For the “regulated NSR pollutant” PM, the following monitoring approach shall be employed to ensure that its emissions also remain below the major stationary source threshold under PSD:

For the two sewage sludge incinerators, emissions factors previously developed and discussed above will be used to require emissions calculations on a monthly basis. The applicant will be required to update the emissions factors on an annual basis through permit revisions. For all other emissions units (other than two SSIs, which are sand storage silo, engines, and boilers), the default aggregated PTE shall be used to simplify the emissions calculations as below:

PM

PM emissions, tons/month =

[emission factor (lb/dry ton) for SSI (ES-1) * amount of sewage sludge charged (tons/month)]
+ [emission factor (lb/dry ton) for SSI (ES-20) * amount of sewage sludge charged (tons/month)]
+ [default total emission rate (ton/month) for all other permitted sources (ES-17, ES-18, ES-19, ES-23, IES-16, IES-3, IES-4, and IES-20)]

Where,

PM emission factor for SSI (ES-1) = 0.13 lb/dry ton

PM emission factor for SSI (ES-20) = 0.061 lb/dry ton

Default PM emission rate (aggregate) for all other permitted sources (ES-17, ES-18, ES-19, ES-23, IES-16, IES-3, IES-4, and IES-20) = 0.33 ton/month (3.94 tons/yr)

The Permittee will be required to keep records of PM emissions calculations on a monthly basis and 12-months rolling average basis. The Permittee will be required to report emissions on semi-annual basis for each of the 6-months period.

6. NSPS, NESHAPS, PSD, Attainment Status, 112(r), CAM

NSPS

Refer to Section 5 above.

NESHAP

Refer to Section 5 above.

PSD

The County of Guilford is in attainment or unclassifiable for all promulgated National Ambient Air Quality standards (NAAQS) in accordance with §81.334. The PSD program applies to major stationary sources and major modifications in this County.

Guilford County has triggered increment tracking under PSD for PM₁₀ and SO₂. However, this permit modification does not consume or expand increments for any pollutants.

Section 5 above includes the discussions on applicability of PSD for the proposed modifications; thus, it needs to be referred to for PSD.

112(r)

The facility is NOT subject to CAA §112(r) and the resulting regulatory requirements in 40 CFR 68 “chemical accident prevention provisions”. The facility does not produce, process, handle, or store any regulated chemicals under this Part above the threshold quantities. However, the facility is not exempt from the general duty for taking steps as necessary to prevent the accidental release of such substance and minimize the consequences of any substance.

CAM

As discussed in Section 5 above, the facility is not a “major source” for Title V as it is taking a limitation to become a synthetic minor source (but still holding a Title V permit due to CAA §129); thus, it is not subject to Compliance Assurance Monitoring (CAM) requirements in 02D .614.

7. Facility-wide Air Toxics

The facility is subject to NC’s air toxics program requirements as per the current permit. Specifically the permit includes approved emissions limits in accordance with 02D .1100 for the existing sewage sludge incinerators (ES 1 and ES-20) for the following pollutants: arsenic, benzene, beryllium, cadmium, carbon tetrachloride, chlorobenzene, chloroform, dichlorobenzene (p), formaldehyde, hexachlorodibenzo-p-dioxin, hydrogen chloride, manganese, mercury, methyl chloroform, methylene chloride, nickel metal, non-specific chromium (VI) compounds, as chromium (VI) equivalent, perchloroethylene, sulfuric acid, tetrachlorodibenzo-p-dioxin, and trichloroethylene. The permit includes the operational limitations with regard to the charging rates for each SSI to no more than 6,000 lbs/hour (ES-1) and 6,500 lbs/hr (ES-20). The Permit also limits operations to no more than one SSI at any time.

With the proposed changes, especially with regard to the concurrent operations of both SSIs, increase in emissions of the above pollutants are expected. Thus, air toxics program requirements may need to be again addressed.

It needs to be noted here that the existing SSIs are exempt from NC’s air toxics program requirements per 02Q .0702(a)(27) as they are Part 61 subject sources. In addition, the existing emergency generators are exempt from the state air toxics program under the same provision as above as they are subject to Part 63 NESHAP. But, the DAQ is still required to determine whether any unacceptable risk to human health exists (if the emissions limits are not included for the exempt sources pursuant to 02D .1100). The Permittee volunteered to submit an air toxic modeling for the scenario with the concurrent operations of the SSIs. The Permittee included the potential emissions rates of various air toxics for two SSIs and insignificant sources associated with the WWTP, but, did not include the emissions of the exempt emergency generators. The DAQ reviewed the submitted modeling and concluded on September 11, 2020 that “the dispersion modeling analysis of TAPs emissions adequately demonstrated compliance with [the] Acceptable Ambient Levels (AALs) outlined in 15A NCAC 02D.1104, on a source-by-source basis.” Tables 7-1 and 7-2 below include the modeled emissions rates and the predicted impacts:

Table 7-1 Modeled Hourly Emission Rates (lb/hr)

Source Description	Arsenic	Benzene	Bis (2-ethylhexyl) phthalate	Chloroform	Chromium VI	Mercury	Sulfuric Acid	Vinyl Chloride	Vinylidene Chloride
SSI (ES-1)	5.180E-05	1.200E-03	2.460E-01	1.200E-02	2.590E-04	1.430E-03	3.600E-01	--	--
SSI (ES-20)	3.870E-04	1.300E-03	2.670E-01	1.300E-02	7.220E-05	1.780E-03	3.900E-01	--	--
Scrubber CD17 Stack	--	6.750E-03	--	1.910E-03	--	--	--	--	--
Scrubber CD18 Stack	--	6.750E-03	--	1.910E-03	--	--	--	--	--
Scrubber CD9 Stack	--	1.920E-03	--	5.850E-03	--	--	--	4.870E-03	7.500E-03
Scrubber CD10 Stack	--	1.920E-03	--	5.850E-03	--	--	--	4.870E-03	7.500E-03

Source Description	Arsenic	Benzene	Bis (2-ethylhexyl) phthalate	Chloroform	Chromium VI	Mercury	Sulfuric Acid	Vinyl Chloride	Vinylidene Chloride
Scrubber for CD5a Stack	--	4.970E-03	--	2.430E-02	--	--	--	--	1.350E-04
Scrubber for CD5b Stack	--	4.970E-03	--	2.430E-02	--	--	--	--	1.350E-04
Scrubber for CD6 Stack	--	4.400E-04	--	2.850E-02	--	--	--	--	1.560E-03

Table 7-2 Maximum Modeled Toxics Impacts

Pollutant	Averaging Period	AAL (µg/m3)	Max Model Concentration % AAL
Arsenic	annual	0.0021	1.43%
Benzene	annual	0.12	41.0%
Bis (2-ethylhexyl) phthalate	24-hour	30	0.95%
Chloroform	annual	4.3	2.00%
Chromium VI	annual	0.000083	24.1%
Mercury	24-hour	0.6	0.30%
Sulfuric Acid	1-hour	100	2.86%
	24-hour	12	3.49%
Vinyl Chloride	annual	0.38	1.27%
Vinylidene Chloride	24-hour	120	0.07%

In summary, because the existing incinerators are subject to Part 61 NESHAP, they are exempt from the air toxics permitting in accordance with 02Q .0702(a)(27)(A). Hence, the emissions rates included in the revised modeling analysis will not be included in the permit. The modeled emissions for all other sources (i.e., sources except two existing SSIs) are for wastewater treatment plant units and they are not subject to any 02D regulation; thus, they cannot be legally required to be included in the permit. Finally, although the Permittee did not include in the modeling demonstration the emissions of exempt emergency generators, the above predicted impacts of various pollutants are not expected to change (increase) significantly due to limited hours of operations (500 hours). Therefore, the DAQ concludes that neither the removal of existing emissions limits nor the exclusion of emissions limits for two SSIs in the revised permit based on the new modeling demonstration is expected to present an unacceptable risk to human health.

8. Facility-wide Emissions

The following Table 8-1 provides a facility-wide emissions summary. The actual emissions are for the calendar year 2019, as reported by City of Greensboro – T Z Osborne WWTP to DAQ via submittal of its emission inventory. The potential emissions (with control) are copied from the application. It should be noted that in addition to actual emissions data for 2019 as tabulated below, page 1 of this application review includes a table on actual emissions data for 2015 through 2018.

Table 8-1 Facility-wide Emissions

Pollutant	Actual Emissions	Potential Emissions (with control)
	tons/yr	tons/yr
PM	1.66	< 100
PM-10	0.8	< 100
PM-2.5	0.74	< 100

Pollutant	Actual Emissions	Potential Emissions (with control)
	tons/yr	tons/yr
SO ₂	6.77	< 100
NO _x	32.51	< 100
CO	11.75	< 100
VOC	17.21	< 100
Lead	0.00044	< 100
GHG as CO ₂ e	NA	82,393
Single HAP (Dichlorobenzene (p), 1,4-	9.28	< 10
Aggregate HAP	< 25	< 25

NA = Not Available

9. Public Notice/EPA and Affected State(s) Review

With respect to the Title V procedures for public participation, pursuant to 15A NCAC 02Q .0521, a notice of the DRAFT Title V Permit will be placed on the NCDEQ website on xx with a comment period beginning xx. The notice will provide for a 30-day comment period with an opportunity for a public hearing. Copies of the public notice will be sent to the persons on the Title V mailing list and EPA on xx. Pursuant to 15A NCAC 02Q .0522, a copy of the permit application and the proposed permit (in this case, the draft permit) will be provided to EPA for their 45-day review on xx. Also pursuant to 02Q .0522, a notice of the DRAFT Title V Permit will be provided to each affected State at or before the time notice provided to the public under 02Q .0521 above. A copy of the final permit will also be provided to the EPA upon issuance as per 02Q .0522.

10. Stipulation Review

The following Table 10-1 lists the changes to the City of Greensboro – T. Z. Osborne Water Reclamation Facility's Air Quality Permit No. 04489T25:

Table 10-1 Summary of Changes to Current Permit

Old Page Air Quality Permit No. 04489T25	Old Section Air Quality Permit No. 04489T25	New Page Air Quality Permit No. 04489T26	New Section Air Quality Permit No. 04489T26	Description of Change(s)
Cover letter & first page of permit				Amended permit numbers and dates.
3	Section 1 Table	3	Section 1 Table	Replace the existing scrubber CD-1 with the new scrubber CD-22. Disassociate the scrubber CD-21 as the incinerator ES-1 emissions control device.
4	Section 2.1.A Table	4	Section 2.1.A Table	Include the new applicable requirements for avoidance of Title V (Section 2.2.A.1.) and avoidance of PSD (Section 2.2.A.2). Remove the non-applicable requirements of both 02D .1100 and 02Q .0711, as the SSIs are subject to Part 61 NESHAP; thus they are exempt from the state air toxics requirements pursuant to 02Q .0702(a)(27).
4	Section 2.1.A.2.	-	-	Remove the non-applicable requirement of 02D .0521. Both SSIs are subject to the PM standard under 02D .0524 which includes both the mass standard of PM and the visible

Old Page Air Quality Permit No. 04489T25	Old Section Air Quality Permit No. 04489T25	New Page Air Quality Permit No. 04489T26	New Section Air Quality Permit No. 04489T26	Description of Change(s)
				emission limit of 20 percent opacity. Since the NSPS includes visible emission limit as well as a part of the PM standard, 02D .0521 cannot apply.
5, 6	Section 2.1.A.3.	4 through 6	Section 2.1.A.2.	Revise this condition pursuant to the requirements of NSPS Subpart O. Remove all references for CD-1. Include the I&M requirements for the new scrubber CD-22 as per the equipment vendor.
6, 7	Section 2.1.A.4.	-	-	Remove the non-applicable requirement of 02D .1100 as the SSIs are subject to Part 61 NESHAP; thus they are exempt from the state air toxics requirements pursuant to 02Q .0702(a)(27).
8	Section 2.1.A.5.	7	Section 2.1.A.3.	Revise this condition pursuant to the requirements of NESHAPs C and E.
8, 9	Section 2.1.A.6.	7 through 12	Section 2.1.A.4.	Completely revise this condition per the current requirements in 02D .1204 (implementing the Part 60 Subpart MMMM).
10	Section 2.1.A.7	12, 13	Section 2.1.A.5.	Revise this condition per the requirements in Part 503 Subpart E.
10	Section 2.1.A.8.	-	-	Remove this requirement of federal plan under 62 LLL - It has been replaced with the state plan in 02D .1204 (60 MMMM).
10	Section 2.1.C. Table	13, 14	Section 2.1.C. Table	<p>Include the new applicable requirements for avoidance of Title V (Section 2.2.A.1.) and avoidance of PSD (Section 2.2.A.2.).</p> <p>Remove the non-applicable requirement in 02Q .0711 as the silo is not expected to emit any NC regulated air toxics.</p>
12	Section 2.1.D. Table	15	Section 2.1.D. Table	<p>Include the new applicable requirements for avoidance of Title V (Section 2.2.A.1.) and avoidance of PSD (Section 2.2.A.2.).</p> <p>Remove the non-applicable requirement of 02Q .0711 as the generators are subject to Part 63 NESHAP; thus they are exempt from the state air toxics requirements pursuant to 02Q .0702(a)(27).</p>
12	Section 2.1.D.1.c	15	Section 2.1.D.1.c	Revise the heading for Monitoring/Recordkeeping to state "Monitoring/Recordkeeping/Reporting".
12, 13	Section 2.1.D.3.	15 through 18	Section 2.1.D.3.	Revise this requirement as per the current language in NSPS Subpart IIII.
15, 16	Section 2.2.A Table, Section 2.2.A.1, and Section 2.1.A.2.	19 through 22	Section 2.2.A Table, Section 2.2.A.1, and Section 2.1.A.2.	<p>Remove the requirement as odorous emissions from the WWTP are exempt as per 02D .1806 and the I&M requirements for various scrubbers have been adequately included under other parts of the permit.</p> <p>Remove the non-applicable requirement in 02Q .0711.</p>

Old Page Air Quality Permit No. 04489T25	Old Section Air Quality Permit No. 04489T25	New Page Air Quality Permit No. 04489T26	New Section Air Quality Permit No. 04489T26	Description of Change(s)
				Include two new requirements for avoidance of Title V (Section 2.2.A.1.) and avoidance of PSD (Section 2.2.A.2).
-	-	23	2.3	Include a new requirement on permit shield especially with the non-applicability of 02D .0614 (40 CFR 64).

11. Conclusions, Comments, and Recommendations

- The application includes the installation of a new Venturipak scrubber (CD-22) and removal of the existing scrubber (CD01) on the existing SSI (ES-1), necessitating the review of design or determination of applicability or appropriateness with regard to regulatory requirement, or interpretation of performance of an air pollution capture and control system. Thus, the PE seal requirement in 02Q .0112 “Applications Requiring Professional Engineer Seal” is triggered. Mr. Keith D. McCulloch, P.E., License No. 027343, has sealed the C8 Forms, and Emissions Assumptions & Calculations of application on March 18, 20120. A search of the registrant directory on the N.C. Board of Examiners for Engineers and Surveyors website confirmed that Mr. McCulloch’s license to practice engineering in the State of NC was in the “current” (i.e., active) status.
- The applicant has included in the application a copy of the local zoning determination request to the City of Greensboro – T. Z. Osborne Water Reclamation Facility. Greensboro City Planning Department has issued a zoning determination dated October 26, 2020, indicating that it has received a copy of the application and the proposed change is consistent with the applicable zoning ordinances.
- The draft permit was emailed to the Permittee for review on December 18, 2020. Mr. Elijah Williams (responsible official) submitted the comments on January 4, 2021 via email as follows. Separately, the applicant’s consultant (Keith McCulloch of GEL Engineering of NC, Inc.) sent an additional comment on the same day. All comments are discussed below:

Application Review

Comment 1:

In Section 2 “Facility Description”, revise the numbers of aeration units from 12 to 18.

Response:

Agreed. This change will be made.

Comment 2:

In Section 5 “Permit Modification/Changes”, describe the FBI (ES-1) as FBI No. 1.

Response:

Agreed. This change will be made.

Draft Permit

Comment 3:

With regard to Section 2.1.A.2.e. on NSPS O monitoring requirement on placement of oxygen monitor upstream of any rabble shaft, the applicant commented that “the regulation does include the term “rabble shaft cooling air inlet” but I think this is only applicable to a multiple hearth incinerator.”

Response:

This permit condition includes the provision for the location of the oxygen monitoring device placement for the FBIs before “any other source of dilution air”. Thus, the DAQ believes that no change is required to the permit condition.

Comment 4:

With regard to annual testing requirement in Section 2.1.A.3.d. to comply with the both beryllium and mercury standards in Subparts C and E of Part 61, the applicant commented as below:

“§61.54 allows for sludge sampling as an alternative. Annual performance testing is not required under 40 CFR Part 61 Subpart E.”

“40 CFR Part 61 Subpart C states that stack sampling is required but does not specify the frequency testing is required.”

Response:

For demonstrating compliance with the beryllium and mercury standards in NESHAPSs C and E, the permit requires in Section 2.1.A.3.d. to comply with the annual stack testing requirement in Section 2.1.A.4.k.i. (continuous compliance requirement under 02D .1204).

As noted above in the section for regulatory discussions, Subpart C does not require monitoring for beryllium emissions. Thus, in accordance with §70.6(a)(3)(i)(B), the DAQ must provide in the permit periodic testing or monitoring to ensure compliance with the beryllium standard.

With regard to Subpart E, the NESHAP includes conditional monitoring requirement on once per year basis in the form of stack testing or sludge sampling if the mercury emissions measured during the (initial) performance test (or sludge sampling) exceed 3.5 lb/24-hour period. Due to actual emissions of mercury being less than the above threshold (as stated above), no monitoring shall apply for mercury emissions for the existing SSIs under Subpart E. Thus, based on §70.6(a)(3)(i)(B), the DAQ must provide periodic testing or monitoring for this applicable requirement. Therefore, similar to the beryllium monitoring above, the DAQ concluded that the annual testing requirement to demonstrate continuous compliance with the requirements in 02D .1204 (40 CFR 60 Subpart MMMM) shall be sufficient for ensuring compliance with the mercury standard in Subpart E (Part 61).

In brief, no change to the draft permit condition shall be made.

Comment 5:

In Section 2.1.A.4.c. Table, remove the minimum scrubber liquid pH establishment requirement for scrubber CD-20.

Response:

The applicant consultant has stated that scrubber CD-20, although used for controlling particulate and metal emissions, the other scrubber CD-21 installed on the FBI (ES-20) is the control device to comply with various standards under 02D .1204 (Subpart MMMM of Part 60). He has said that the scrubber liquid pH adjustment is performed for the scrubber CD-21 and not CD-20; thus the permit should not include any scrubber liquid pH establishment requirement for scrubber CD-20. The DAQ will remove this requirement for establishment of scrubber liquid pH for the scrubber CD-20.

Comment 6:

In Section 2.2.A.1.f., the DAQ has proposed to establish new emissions factors for FBIs for individual HAP (1,4 dichlorobenzene), aggregate HAPs (1,4 dichlorobenzene, naphthalene, and bis (2-ethylhexyl) phthalate), and other pollutants (PM₁₀, PM_{2.5}, SO₂) through performance annual testing, to comply with the applicable synthetic minor limitations. The applicant has questioned this testing requirement as “what regulatory requirement is the basis for performing an annual stack test for the HAPs discussed above from FBI Nos. 1 and 2?”

Response:

The draft permit includes the AP-42 emissions factors (Section 2.2) for the sewage sludge incineration. These emissions factors are nationwide averages for this source category. The DAQ believes that they may not be representative for the existing FBIs at the City of Greensboro T Z Osborne WWTP. Thus, the DAQ has required in the draft permit revisions to the included emissions factors on an annual basis so that the emissions for various pollutants can be monitored accurately. After further discussions with the applicant, it was decided that after the first revision to the emissions factors included in the permit, the subsequent revisions to the established factors will be required once every five years from the previous revision.

Comment 7:

The applicant questions the need for two separate applications in Section 2.1.A.4.e. for revising the operating parameter values.

Response:

After consultations with the permitting supervisors, it was decided to require only one permit revision using 02Q .0515 (minor modification) for the cases when value for one operating parameter, observed during the performance test, is more stringent than the applicable value included in the permit, while for some other parameter, the observed value during the same stack is less stringent than the applicable value included in the permit. The DAQ believes that this will resolve the applicant's issue, streamline the permitting, and meet the processing requirements for Title V permit modifications in Part 70 (02Q .0500). The draft permit condition will be revised accordingly.

- The draft permit was emailed to the WSRO (Winston-Salem Regional Office) on December 18, 2020. Robert Barker from the regional office emailed one comment as below on January 4, 2021:

Comment 1:

"The language under 2.1.A.4.e (third paragraph) on page 9 may need to be reworded. The third paragraph makes it sound as if the facility needs to submit two applications if the parameter values during the stack test are more and/or less stringent. It appears that in the second part of the paragraph, if the parameter value is less stringent, an application would be optional."

Response:

Please refer to the response to applicant-comment 7 above.

- This permit engineer recommends issuing the final permit after completion of public notice (30-day) and EPA review (45-day) periods.